

REMARKS

Claims 21-54 are pending in the subject application, have been examined and stand rejected. By way of the above amendments, claim 27 has been amended. Favorable reconsideration of the application and allowance of all of the pending claims are respectfully requested in view of the following remarks.

Claims 21-54 stand rejected under 35 U.S.C. §112, first paragraph. The Examiner asserts that the subject matter of these claims was not adequately described in the specification. Applicants respectfully traverse this rejection and the Examiner's assertion that the claims are not supported by the specification.

The subject matter of the claims is clearly supported in the specification (e.g., see pages 7-22). In particular, the subject matter of claim 21 is clearly supported, for example, by the basic process steps described at pages 9-10 of the specification (i.e., steps 1-4 at pages 9-10 correspond with steps (a) – (d) of claim 21). The examples (pages 10-18) further support claim 21 as well as the various features recited in the dependent claims. The Examiner is therefore requested to withdraw this rejection of the claims. However, if this rejection is maintained after reviewing the above-noted portions of the specification, the Examiner is respectfully requested to specify precisely which features of the claims the Examiner believes are not supported by the claims.

Claims 28 and 53 stand rejected under 35 U.S.C. §112, second paragraph. Applicants respectfully traverse these rejections, and request that they be withdrawn. With respect to claim 28, the Examiner asserts that the term "S" is indefinite as to what this term refers. However, the term "S concentration", which is recited in both claims 27 and 28, is clearly defined at page 4, lines 3-9, of the specification. Therefore, this term is not unclear or indefinite, but rather is very clear in view of the specification.

The Examiner further asserts that "the recovered carbonate-bearing hydrocalumite" limitation of claim 53 lacks improper antecedent basis. However, it is noted that claim 53 depends from claim 40, which depends from claim 39, which depends from claim 22. Claim 22

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refers to recovering a separated carbonate-bearing hydrocalumite. Therefore, this limitation in claim 53 does not lack antecedent basis, as it is set forth in claim 22.

The Examiner rejects claims 21-54 on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-14 of U.S. Patent No. 6,743,403. Submitted concurrently herewith is a terminal disclaimer that disclaims the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. §§154 to 156 and 173, as presently shortened by any terminal disclaimer, of prior U.S. Patent No. 6,743,403 (“the ‘403 patent”). The present application is a continuation of the ‘403 patent. Further, the Assignment document was recorded at the USPTO for the ‘403 patent at Reel 012346, Frame 0152, and this Assignment document conveys all rights to the assignee in continuations pertaining to the invention described in the ‘403 patent. Accordingly, the present application is commonly assigned with the ‘403 patent. The Examiner is therefore requested to withdraw the non-statutory obviousness-type double patenting rejection of the claims.

Claims 21, 23, 27-39 and 41-52 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,335,082 to Matyasi et al. (“Matyasi”) in view of Australian Patent Document No. AU 32197/93 to Cristol et al. (“Cristol”). In addition, claims 24 and 26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Matyasi in view of Cristol, and further in view of U.S. Patent No. 3,899,571 to Yamada et al. (“Yamada”).

Claim 21 recites a process for the removal and causticisation of sodium oxalate and/or sodium sulphate from a Bayer process liquor containing carbonate ions and oxalate and/or sulphate ions, where the process comprises: (a) treating the Bayer process liquor to remove carbonate ions by forming carbonate-bearing solids; (b) separating the carbonate-bearing solids to form a clarified liquor containing residual carbonate ions and oxalate and/or sulphate ions; (c) adding lime to the clarified liquor to remove the residual carbonate ions and form reacted lime solids including the oxalate and/or sulphate ions; and, (d) separating the reacted lime solids to form a purified liquor. No combination of Matyasi with Cristol renders obvious these combined features.

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One distinguishing feature between the invention of claim 21 and the cited art is that oxalate and/or sulphate are removed from a Bayer process liquor via a reaction in which an offending anion is removed by reaction with a calcium species (e.g., hydrocalumite with oxalate or sulphate as the guest anion, or calcium oxalate), where the offending anion is replaced with a hydroxyl ion. Thus, the claimed invention relates to both the removal and causticisation of sodium oxalate and/or sodium sulphate.

Matyasi and Cristol relate to processes involving enhanced precipitation of sodium oxalate and not causticising reactions of the oxalate. In particular, the processes of Matyasi and Cristol relate to removing various species from solution that interfere with the precipitation of sodium oxalate, where each reference teaches increasing oxalate supersaturation to improve removal of sodium oxalate.

Referring to Matyasi, a process is taught for removing organics from Bayer liquors, where the precipitation of oxalate is enhanced by evaporating the liquor thus causing the oxalate to salt out. Matyasi further recognizes the potential problems with this method, since this further involves the co-precipitation and removal of sodium carbonate (see Col. 2, lines 56-71 of Matyasi). Matyasi teaches a causticisation of the liquor to remove carbonate before the precipitation of oxalate. At best, the process taught by Matyasi is as follows: (a) causticising the liquor with lime; (b) removing the precipitate (which is primarily calcium carbonate); (c) evaporating the filtrate to increase the supersaturation of sodium oxalate, as well as other sodium salts of organic species; (d) separating the precipitated organic sodium salts; and (e) returning the clarified liquor to the refinery.

The Examiner asserts (see page 4 of Office Action) that Matyasi teaches that oxalates are removed by a process comprising causticisation with lime and evaporation. Applicants respectfully disagree with this assertion. Clearly, Matyasi teaches the addition of lime only in a first step (i.e., step (a) as noted above) to precipitate and remove calcium carbonate prior to the evaporation step. The removal of oxalate is achieved, not by the addition of lime to yield a reaction forming lime solids that includes oxalate, but by evaporating the filtered liquor to precipitate the oxalate. There is simply no teaching in Matyasi of the further addition of lime at the stage in which the liquor is

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evaporated and the oxalate precipitate is formed. Thus, Matyasi fails to teach or suggest the addition of lime to a clarified liquor to remove residual carbonate ions and form reacted lime solids including oxalate and/or sulphate ions as recited in step (c) of claim 21.

The Examiner further appears to acknowledge that Matyasi fails to teach all of the process steps of claim 21. In particular, the Examiner indicates (page 4 of the Office Action) that Matyasi *"may differ in not teaching the addition of lime after the carbonate removal stage to precipitate oxalates."* However, the Examiner asserts that providing such a feature to Matyasi would have been obvious in view of the teachings of Cristol. Applicants respectfully disagree.

Cristol teaches the addition of finely divided lime as a destabilizing agent after sodium oxalate has been supersaturated by concentrating the Bayer liquor with a specific range of sodium oxide concentrations. The finely divided lime serves as a seed for the precipitation of oxalate from the supersaturated solution due to a solid/liquid interface in which a large surface area is developed by the finely divided lime in contact with the liquor (see page 7, lines 4-10 of Cristol). There is no teaching in Cristol that the finely divided lime causticises or reacts with any components of the Bayer liquor, let alone forming reacted lime solids including the oxalate and/or sulphate ions as recited in claim 21.

It is further submitted that no combination of Matyasi with Cristol would suggest to one having ordinary skill in the art the feature of adding lime to a clarified liquor to remove residual carbonate ions and form reacted lime solids including the oxalate and/or sulphate ions. As noted above, both of these two references are concerned with concentrating a Bayer liquor by evaporation, followed by precipitating oxalate from the liquor. Further, each of these two references relates to a workable process for removing oxalate from a Bayer liquor in a specific context of what is taught in the reference. It is therefore not clear as to why one skilled in the art would combine these two processes in any manner, absent improper hindsight and reliance upon the claimed invention.

At best, one might consider modifying Matyasi in view of Cristol in order to enhance the sodium concentration within the Bayer liquor. However, Matyasi already teaches achieving a sodium concentration of 200-400 g/L without the requirement of adding finely divided lime, while Cristol teaches achieving a concentration of between 170-250 g/L. Since Matyasi already appears

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capable of achieving the same or greater sodium concentrations in the supersaturated solution without the addition of finely divided lime, it is unclear as to why one would have been motivated to add yet another step to this process (since it is not clear whether concentration would have been enhanced further). Further, Matyasi teaches evaporation temperature ranges of between 70°C - 100 °C, while Cristol teaches temperature ranges of 40 °C - 60 °C. Cristol further teaches the addition of lime is unsuitable at temperatures exceeding 70 °C.

For all of the foregoing reasons, it is respectfully submitted that claim 21 is not obvious and should be allowed over any combination of Matyasi with Cristol. The Examiner is therefore requested to withdraw the rejection of claim 21 based upon these two references.

Claims 23, 24, 26-39 and 41-52 depend from claim 21 and therefore include all of the limitations of their parent claim. Accordingly, these claims should be allowed over Matyasi in view of Cristol and/or Yamada. The Examiner is therefore requested to withdraw the rejections of these claims based upon these references.

Further, it is noted that Yamada cannot be combined with Matyasi and Cristol in an attempt to reject claims 24 and 26. A discussion of Yamada is provided in Cristol, in which Cristol states that a seeding process of sodium oxalate to cause precipitation of sodium oxalate in the supersaturated solution suffers certain disadvantages and a potential reduction in sodium oxalate precipitation yield (see page 3, line 23, to page 4, line 18, of Cristol). Matyasi also discusses Yamada (see Col. 2, lines 28-39 of Matyasi) and the problems and disadvantages associated with this method. Clearly, both Matyasi and Cristol teach away from seeding the liquor with sodium oxalate in an effort to cause precipitation of sodium oxalate in the liquor. Therefore, absent improper hindsight and reliance upon the claimed invention, there is no reasonable motivation to combine Matyasi and Cristol further with Yamada in an effort to reject claims 24 and 26.

In view of the foregoing, the Examiner is respectfully requested to withdraw the rejections and to find the application to be in condition for allowance with claims 21-54. However, if for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is respectfully requested to call the undersigned attorney to discuss any unresolved issues and to expedite the disposition of the application.

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Applicant hereby petitions for any extension of time that may be required to maintain the pendency of this case, and any required fee for such extension is to be charged to Deposit Account No. 05-0460.

Respectfully submitted,

/Andrew J. Aldag/
Andrew J. Aldag
Registration No. 40,483

EDELL, SHAPIRO & FINNAN, LLC
1901 Research Boulevard, Suite 400
Rockville, Maryland 20850-3164
(301) 424-3640
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